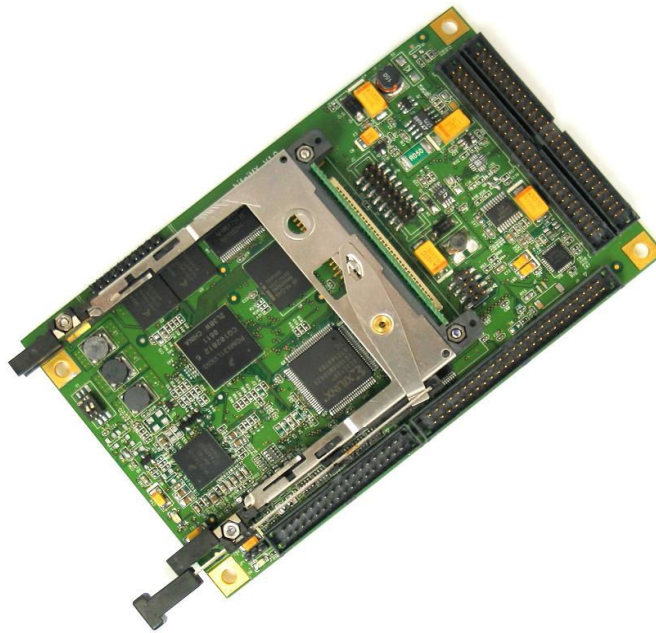


Bitsy G5

User's Manual



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Applied Data Systems

10260 Old Columbia Road
Columbia MD 21046 USA
301-490-4007

www.applieddata.net

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About the Cover Image

The cover image shows a revision 3 Bitsy G5.

Printing this Manual

This manual has been designed for printing on both sides of an 8.5x11 inch paper, but can be printed single-sided as well. It has also been optimized for use in electronic form with active cross-reference links for quick access to information.

Revision History

REV	DESCRIPTION	BY
1	Preliminary release of Sections 1,2,3 and 7	08/09/2007 ch

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1 Introduction

1.1 Overview

The Bitsy G5 is a full-featured single board computer using the i.MX31 Multimedia Applications Processor. The Bitsy G5 is designed to meet the needs of embedded and graphical systems developers.

This manual applies to the latest revision of the Bitsy G5, as listed in the revision history, section 7.2.

1.2 Features

1.2.1 Processor

- Freescale i.MX31 32-bit ARM RISC processor
- ARM1136JF-S core with Vector Floating Point coprocessor and multi-level cache system
- Multimedia support including VGA MPEG-4 Hardware Encoder, Image Processing Unit and Graphics Accelerator
- Clock rates up to 532 MHz
- Battery-backed real-time clock

1.2.2 Power Supply

- 6-15 V main power input
- Freescale MC13783 Power Management and Audio Circuit

1.2.3 Memory

- 128 MiB DDR SRAM^{1 2}
- 32 MiB NOR Flash memory³
- PCMCIA, Type I and II, 3.3 and 5 V

¹ The Bitsy G5 supports 32, 64 or 128 MiB DDR SRAM.

² MiB is the IEC abbreviation for mebibyte = 2^{20} byte = 1 048 576 byte. The kibi and mebi prefixes are based on the 1998 IEC standard for binary multiples. For further reading, see the US NIST web site, <http://physics.nist.gov/cuu/Units/binary.html>

³ The Bitsy G5 supports 8, 16, 32 or 64 MiB of NOR flash memory.

1.2.4 Communications

- USB 2.0 Host Port and On-The-Go (OTG) Port supporting high (480 Mbit/s), full (12 Mbit/s) and low (1.5 Mbit/s) speeds
- Three Serial Ports
 - Serial 1: EIA-232, 3.3V logic level (9-wire)
 - Serial 2: 3.3V logic level (3-wire); IrDA and EIA-232 with optional personality board
 - Serial 3: EIA-232, 3.3V logic level (5-wire)
- Four additional EIA-232 serial ports with optional personality board
- I²C bus with I²C master device
- Serial Peripheral Interface (SPI) port
- Secure Digital (SD/SDIO) and Multimedia Card (MMC) support
- 10/100BT Ethernet, RJ45 with optional personality board
- Expansion bus with optional personality board

1.2.5 User Interface and Display

- Flat Panel Interface
- Software-control of external VEE Generator for passive LCD contrast control
- Analog Touch Panel Interface (four- or five-wire options)
- External PS/2 Keyboard Support

1.2.6 I/O

- Nine ADSmartIO[™] ports configurable for digital I/O, A/D inputs (up to four) and/or up to 4x5 keypad
- Ten digital I/Os
- Backlight Control Signals for Intensity and On/off
- External Temperature Probe support

1.2.7 Audio Interface

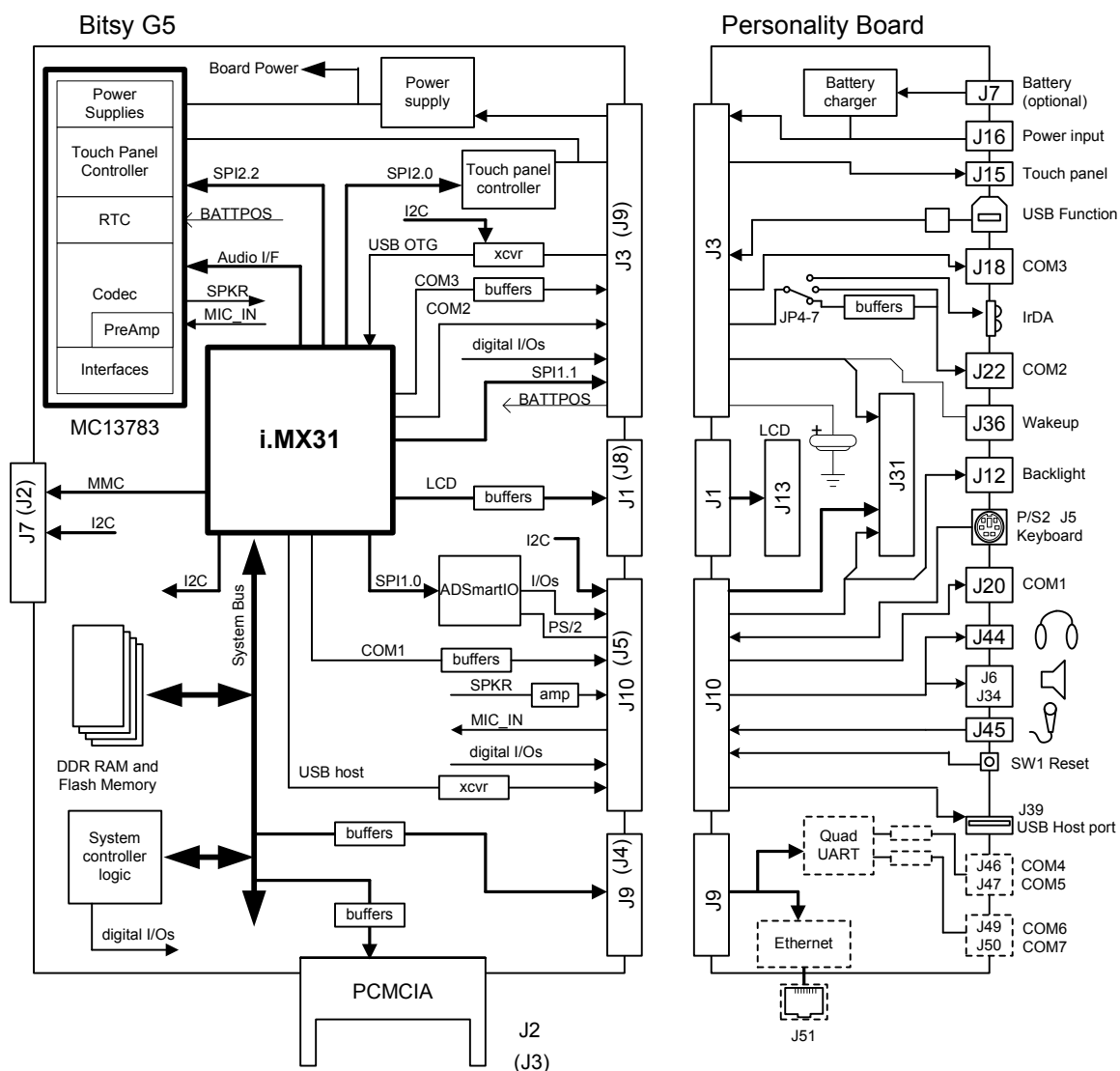
- Codec implemented by Freescale MC13783 Power Management and Audio Circuit
- Stereo Microphone Input
- Stereo 1W Speaker Outputs
- Headphone Output

1.3 Block Diagram

The following diagram illustrates the system organization of the Bitsy G5. Arrows generally indicate the direction of control and data flow.

Connector reference designators given are for the Bitsy family products. Connector reference designators on the Bitsy G5 are labeled differently and are shown as (Jx).

The diagram also illustrates a composite of the three Bitsy Personality Boards⁴. Connectors not found on all boards are drawn with dotted lines. See section 2.1.2 for additional details about the personality boards.



⁴ Personality board connectors cited in the block diagram are from the rev A Ethernet/CompactFlash Personality Board and the rev 3 Quad UART Personality Board.

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2 Getting Started

2.1 *Development Systems*

Bitsy G5 boards are shipped as development systems designed to get the developer up and running quickly.

To use the system, simply plug the power supply into the mini DIN-8 receptacle on the system.

If the screen does not display anything after five to ten seconds, check the *Frequently Asked Questions*, below. Most operating systems cold boot within twenty seconds.

2.1.1 System Components

A typical development system is shown at right. It consists of the following components:

- Bitsy G5 single-board computer
- Bitsy Personality Board
- Flat panel display and cable
- Backlight inverter and cable
- Touch screen and cable
- 100-240 VAC power adapter
- Plexiglas mounting
- Developer's Cable Kit including
 - Serial Port DB9 adapter (ADS cable #610111-80001)
 - DB9F/F null modem cable
 - USB A-B cable
- Operating system of your choice
- User's Guide (this document and operating system guide)



Please make sure you have received *all* the components before you begin your development.

2.1.2 Bitsy Personality Boards

The Bitsy G5 often works in tandem with another board to add functionality and customize the system for its application. Personality boards can add custom circuits and locate connectors best suited for the application design. At the time of writing, a new BitsyXb/G5 Personality Board is under development. Details are tbd.

2.2 *Frequently Asked Questions*

The following are some of the most commonly asked questions for development systems:

Q: When I plug in power, my screen is white and nothing comes up on it.

A: Check the connector seating. The flat panel connector may have come loose in shipping. Press it firmly into the panel and reapply power to your system.

Q: Is there online support?

A: Yes. Information about the Bitsy G5 hardware and software is available on the ADS support site at <http://www.applieddata.net/support>. See section 2.4 for further details.

Q: When I plug in power, my screen stays black.

A: If your system has supercapacitors installed (section 5.2.3), your system may be asleep. Try waking up the system by shorting the wakeup signal (BitsyXb J3 pin 45 or Bitsy G5 J9 pin 45) to ground. Development systems include a two-pin header on the personality board whose pins can be shorted together to wake the system. You may also press the reset button to fully restart the system.

Q: When I plug in power, the LED doesn't turn on.

A: Your system may still be booting. The LED is software controlled and is not necessarily turned on at boot.

Q: Do I have to turn off the system before I insert a PCMCIA?

A: No. The Bitsy G5 supports hot-swapping of PCMCIA cards. Consult the operating system documentation for details.

Q: Do I need to observe any ESD precautions when working with the system?

A: Yes. If possible, work on a grounded anti-static mat. At a minimum, touch an electrically grounded object before handling the board or touching any components on the board.

Q: What do I need to start developing my application for the system?

A: You will need a flash ATA card (32 MiB or larger, 128 MiB recommended) and the cables supplied with your system to interface your development station to the system. For further direction, consult the ADS guide for the installed operating system.

Q: Who can I call if I need help developing my application?

A: ADS provides technical support to get your development system running. For customers who establish a business relationship with ADS, we provide support to develop applications and drivers.

Q: Can I upgrade the version of the operating system?

A: Yes. ADS provides regular operating system updates on its developers' web site. For operating systems not maintained by ADS, contact the operating system vendor.

Q: I would like to interface to a different display panel. How can I do this?

A: ADS may have already interfaced to the panel you are interested in. Consult ADS for availability.

2.3

Organization of this Manual

The manual organizes information in five key sections:

Introduction	Provides an overview of the functionality and organization of the Bitsy G5, as well as how to use this manual.
Hardware Reference	Describes the configuration settings and pinouts for all connectors and jumpers on the Bitsy G5.
Feature Reference	Gives details about the various subsystems of the Bitsy G5.
Power Management	Provides key information about power management, tips for system integration and electrical and mechanical interface specifications.

Specifications Electrical and mechanical interface specifications.

To locate the information you need, try the following:

1. Browse the *Table of Contents*. Section titles include connector designators and their function.
2. Follow cross-references between sections.
3. View and search this manual in PDF format

2.4 *Errata, Addenda and Further Information*

Errata and addenda to this manual are posted on the ADS support forums along with the latest release of the manual. Consult the support forums any time you need further information or feel information in this manual is in error. You may access the forums from the ADS support site,

<http://www.AppliedData.net/Support>

In addition to manuals, the support forums include downloads, troubleshooting guides, operating system updates and answers to hundreds of questions about developing applications for ADS products. You may also post questions you have about ADS products on the forums.

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3 Hardware Reference

This section gives an overview of the hardware features of the Bitsy G5. This overview includes a description of the switches, jumper settings, connectors and connector pinouts.

Many connectors and headers have a visible number or marking on the board that indicates pin 1. If that pin is not clearly marked, there are two other ways to locate pin 1:

1. For through-hole connectors, look at the underside of the board. The square pad is pin 1.
2. Download the mechanical drawing of the Bitsy G5 available on the ADS Support site (section 2.4). The square or indicated pad on each connector is pin 1.

3.1 *Switches, Controls and Indicators*

3.1.1 S1: DIP Switch

S1 is a two-position DIP switch located on the edge of the board at the opening of the PCMCIA socket. When in the "ON" position, switches are closed and connect to ground. Otherwise they are pulled up.

DIP switch positions "1" and "2" connect to the i.MX31. Most operating systems on the Bitsy G5 reserve these switches for their use. Consult the operating system manual for details.

3.1.2 D9: Green LED Indicator

The Bitsy G5 has one onboard green light-emitting diode (LED), located on the corner of the board next to JP2, that is controlled by the processor. The LED is driven by the same buffers as the display driver data lines. The LED will be off when the display buffers are disabled (see power management section 5.2.2).

3.1.3 D7: Red LED Indicator

The Bitsy G5 has one onboard red LED that is connected to the MC13783 trickle LED driver output. It is located at the edge of the board under the opening of the PCMCIA socket.

3.2 *Jumper Settings*

There is just one user-selectable jumper on the Bitsy G5. It uses a 2mm shorting block (shunt) to select the setting. Turn off power to the Bitsy G5 before changing the position of a shunt.

3.2.1 JP2: LCD Display Power Select

Type: 3-post header, 2mm

This jumper selects the supply voltage for the LCD display. The three-pin header is located near the PCMCIA ejector button.

Jumper setting	Voltage Selected
1-2	V_{cc} (5.0 V)
2-3	V_{ddx} (3.3 V)



WARNING! The pin out of JP2 on the Bitsy G5 is not the same as the pin out for the BitsyXb. Make sure you have selected the correct voltage before connecting the panel. Flat panels can be irreparably damaged by incorrect voltages.

3.3 Signal Connectors

The following tables describe the electrical signals available on the connectors of the Bitsy G5. Each section provides relevant details about the connector including part numbers, mating connectors, signal descriptions and references to related chapters.

To locate pin 1 of a connector, look for numbers silk screened on the component side⁵ of the Bitsy G5, or look at the bottom side of a connector for the square pad, which is pin 1. As seen from the component side, double-row headers on the board are numbered as shown in the figure to the right.

2	4	6	8...
1	3	5	7...

For information about the location of the connectors on the Bitsy G5, refer to section 6.1.1.

Legend:

n/c	Not connected
GND	Bitsy G5 ground plane
(4.1)	Reference section(s) for signals

Signal Types

I	signal is an input to the system
O	signal is an output from the system
IO	signal may be input or output
P	power and ground
A	analog signal
OC	open collector output



The reference designators on the Bitsy G5 are labeled differently than the previous four generations of the Bitsy family products or the mating personality board. The Bitsy family products reference designators are listed in the following sections with the reference designators on the Bitsy G5 shown as (Jx).

3.3.1 J1 (J8): LCD Panel Interface Connector

Board Connector: 2x17, 2mm spacing, Samtec STMM-117-02-G-D

Recommended Mating Cable: Samtec TCSD Series

Recommended Board-to-Board Connector: ESQT series (e.g. ESQT-117-02-F-D-500)

The following table describes the signals on the LCD interface connector. Signal names shown are for TFT active matrix color LCDs at 16 bpp (bit-per-pixel). For other color depths and LCD technologies, consult the table in section 4.6.4.

Signals from the i.MX31 are buffered and RFI filtered before reaching J1 (J8). The LCD panel output buffers operate at a fixed 3.3 V. See section 4.6 for further details about displays.

Pin	i.MX31 Signal Name	Color Active TFT Display at 16bpp	
		ADS Signal Name	Description
1		n/c	
2		GND	ground
3	FPSHIFT	PNL PIXCLK	Pixel Clock
4	HSYNC	PNL HSYNC	Horizontal Sync.
5	VSYNC3	PNL VSYNC	Vertical Sync.
6		GND	ground

⁵ The "component side" of the Bitsy G5 is the one on which the PCMCIA ejector is installed.

7	LD12	PNL_RED0	Red Bit 0
8	LD13	PNL_RED1	Red Bit 1
9	LD14	PNL_RED2	Red Bit 2
10	LD15	PNL_RED3	Red Bit 3
11	LD16	PNL_RED4	Red Bit 4
12	LD17	PNL_RED5	Red Bit 5
13		GND	ground
14	LD6	PNL_GREEN0	Green Bit 0
15	LD7	PNL_GREEN1	Green Bit 1
16	LD8	PNL_GREEN2	Green Bit 2
17	LD9	PNL_GREEN3	Green Bit 3
18	LD10	PNL_GREEN4	Green Bit 4
19	LD11	PNL_GREEN5	Green Bit 5
20		GND	ground
21	LD0	PNL_BLUE0	Blue Bit 0
22	LD1	PNL_BLUE1	Blue Bit 1
23	LD2	PNL_BLUE2	Blue Bit 2
24	LD3	PNL_BLUE3	Blue Bit 3
25	LD4	PNL_BLUE4	Blue Bit 4
26	LD5	PNL_BLUE5	Blue Bit 5
27		GND	ground
28	Drdy0	PNL_LBIAS	Data Enable
29		PNL_PWR	Vcc (5 V) or 3.3 V (JP2)
30			
31		PNL_RL	Horizontal Mode Select (set by R247 or R246)
32		PNL_UD	Vertical Mode Select (set by R248 or R249)
33	ADSmartIO PD0	PNL_ENA	Panel enable signal
34		VCON	low-voltage adjust for contrast control of some displays (6.3.2) (zero to PNL_PWR volts)

3.3.2 J2 (J3): PCMCIA

Integrated ejector: FCI 95620-050CA

The 68-pin PCMCIA socket conforms to the PCMCIA standard for 5V-tolerant Type II cards, and can also be run at 3.3 V. The socket is normally de-energized; the operating system is responsible for turning on the socket when a card is inserted and turning it off when the card is removed.

Ejector hardware is standard.

Vpp (pins 18 and 52), which is 12 V in older PCMCIA implementations, is left unconnected in this implementation. See section 6.3.7 for electrical specifications.

3.3.3 J3 (J9): Power, I/O, Serial 2 & 3, USB, Touch Screen and others

Board Connector: 2x25, 2mm spacing, Samtec STMM-125-02-G-D

Recommended Mating Connector: Samtec TCSD Series

Recommended Board-to-Board Connector: ESQT series (e.g. ESQT-125-02-F-D-500)

Pin	Name	Pin	Type	Description		
1	EIO9		IO	General Purpose Digital I/Os (4.7.1, 6.3.9)		
	EIO8	2	IO			
3	EIO7		IO			
	GND	4	P	ground		
		6				
	VCC	8	PO	+5 V		
		10				
5	TEMP_SENSOR MINUS		AI	External Temperature Probe Connection (4.3.5)		
7	TEMP_SENSOR PLUS		PO			
9	/IRDAON		O	External IRDA control output		
11	TSPX		AIO	right	UL	Touch screen (6.3.3)
13	TSMY		AIO	top	LR	
15	TSMX		AIO	left	LL	
17	TSPY		AIO	bottom	UR	
	EIO5	12	IO	General Purpose Digital I/Os (4.7.1, 6.3.9)		
	EIO6	14	IO			
	BACKLIGHT PWM	16	AO	Backlight Intensity (PWM) (4.6.6, 6.3.2)		
	/BACKLIGHT ON	18	OC	Backlight On/Off (open-collector) (4.6.6, 6.3.2)		
19	RXD2T		I	Serial 2 (3.3 V logic level) (4.5.1)		
	TXD2T	20	O			
21	WIPER		AI	Touch screen wiper (optional 5-wire touch)		
	PB0	22	O	ADSmartIO ⁶ (5.2.7)		
23	GND		P	ground		
	PE2	24	O	Power Enable #2 for external devices (5.2.2)		
25	CTS3		I	Serial 3 (EIA-232) (4.5.1)		
	TXD3	26	O			
27	RTS3		O			
	RXD3	28	I			
29	USB+		IO	USB Client (4.5.2)		
	USB-	30	IO			
31	GND		P	ground		
	HP_IN	32	I	Headphone connection (4.4.2, 6.3.8)		
33	USB_RECONN		0	USB Client power management ⁶ (4.5.2)		
	GND	34	P	ground		
		36				
35	STXD		O	SPI signals (4.5.3)		
37	SRXD		I			
39	SCLK2		O			
43	SFRM2		O			

⁶ This output does not have any series resistance or ESD protection.

Pin	Name	Pin	Type	Description
	<i>VBATT_POS</i>	38	<i>PI</i>	<i>External Battery Input (5.2.7)</i>
	<i>VBATT_NEG</i>	40	<i>P</i>	
41	<i>POWERENABLE</i>		<i>O</i>	<i>Power Supply Control Output (5.2.2)</i>
	<i>/PE1</i>	42	<i>O</i>	<i>Power Enable #1 for external devices (5.2.2)</i>
	<i>DCIN_POS</i>	44	<i>PI</i>	<i>External Power Input</i>
		48		
45	<i>/RQONOFF</i>		<i>I</i>	<i>"Request On/Off" Switch Input (5.2.3, 6.3.1)</i>
	<i>GND</i>	46	<i>P</i>	<i>ground</i>
47				
49				
	<i>BATPOS</i>	50	<i>PI</i>	<i>Real-time clock backup battery (4.2, 6.3.4)</i>

3.3.4 J7 (J2): I²C and SDIO/MMC

Board Connector: 2x8, 2mm spacing, Samtec STMM-108-02-G-D-SM

Recommended Board-to-Cable Connector: TCSD series

Recommended Board-to-Board Connector: ESQT series (e.g. ESQT-108-02-F-D-450)⁷

This header supplies the signals for the I²C (4.5.4) and SDIO/MMC (4.5.5) interfaces. See the respective sections in Chapter 4 for additional details about how the signals are used.

Pin	Name	Type	Description
1	<i>I2C_SDA</i>	<i>IO</i>	<i>I²C (4.5.4)</i>
2	<i>I2C_SCL</i>	<i>IO</i>	
3	<i>GND</i>	<i>P</i>	<i>ground</i>
4		<i>P</i>	
5	<i>SD_DAT2</i>	<i>IO</i>	<i>SDIO/MMC signals (4.5.5)</i>
6	<i>SD_DAT3</i>	<i>IO</i>	
7	<i>SD_CMD</i>	<i>IO</i>	
8	<i>SD_DAT0</i>	<i>IO</i>	
9	<i>SD_CLK</i>	<i>O</i>	
10	<i>/SD_CD</i>	<i>I⁸</i>	
11	<i>VDDX</i>	<i>PO</i>	<i>3.3 V</i>
12	<i>VCC</i>	<i>PO</i>	<i>5 V</i>
13	<i>/SD_WP</i>	<i>I</i>	<i>SDIO/MMC signals (4.5.5)</i>
14	<i>/SDIO_IRQ</i>	<i>I</i>	
15	<i>/SD_PWREN</i>	<i>O</i>	
16	<i>SD_DAT1</i>	<i>IO</i>	

⁷ Note that the STMM header is 0.050-inch higher than the other 2mm headers on the board because it is a surface-mount part. Use a correspondingly shorter socket on mating boards.

⁸ Pulled-up on Bitsy G5 with 4.7k Ω resistor.

3.3.5 J9 (J4): Expansion Bus

Board Connector: 2x5, 2mm spacing, Samtec STMM-125-02-G-D

Recommended Mating Connector: Samtec TCSD Series

Recommended Board-to-Board Connector: ESQT series (e.g. ESQT-125-02-F-D-500)

These signals can be used to expand the capabilities of the Bitsy G5 as a 3.3 V digital expansion bus. See section 4.1.5 for details.

Pin	Name	Pin	Type	Description
1	GND		P	ground
	n/c	2		
	n/c	4		
3	PCBD10		IO	Data8-10
5	PCBD9		IO	
7	PCBD8		IO	
	PCBD2	6	IO	Data0-2
	PCBD1	8	IO	
	PCBD0	10	IO	
9	n/c			
11	n/c			
	n/c	12		
13	PCBA11		O	Address 11
15	VCC		PO	5 V
17	/CARDBWAIT		I	Wait
19	CARDBRES		O	Reset
	PCBA0	14	O	Address0-6
	PCBA1	16	O	
	PCBA2	18	O	
	PCBA3	20	O	
	PCBA4	22	O	
	PCBA5	24	O	
	PCBA6	28	O	
21	n/c			
23	+3.3V		P0	+3.3 V
25	/CARDBON		O	5 V Power Control
	n/c	26		
27	CF /INT		I	Interrupt Signal
29	/CARDBMWR		O	Memory Write
31	n/c		O	
33	BEB1 B		O	IO Read
	PCBA7	30	O	Address7-9
	PCBA8	32	O	
	PCBA9	36	O	
	/CARDBMRD	34	O	Memory Read
35	n/c			
37	CS_CF		O	Chip Select
		38		

Pin	Name	Pin	Type	Description
39	PCBD15		IO	Data11-15
41	PCBD14		IO	
43	PCBD13		IO	
45	PCBD12		IO	
47	PCBD11		IO	
	PCBD7	40	IO	Data3-7
	PCBD6	42	IO	
	PCBD5	44	IO	
	PCBD4	46	IO	
	PCBD3	48	IO	
49	n/c			
	/CARDBON_3P3V	50	O	3.3 V Power Control

3.3.6 J10 (J5): ADSmartIO, USB, Serial 1, Stereo Audio, I/Os

Board Connector: 2x25, 2mm spacing, Samtec STMM-125-02-G-D

Recommended Mating Connector: Samtec TCSD Series

Recommended Board-to-Board Connector: ESQT series (e.g. ESQT-125-02-F-D-500)

Pin	Name	Pin	Type	Description
1	/EXT_IRQ1		I	External Interrupt 1 Input
3	/EXT_IRQ2		I	External Interrupt 2 Input
5	EIO4	2	IO	General Purpose Digital I/Os (4.7.1, 6.3.9)
	EIO3		IO	
	EIO2		IO	
	EIO1		IO	
	EIO0		IO	
7	SIGPS2		IO	External PS/2 keyboard inputs
9	CLKPS2		IO	
	USB_PWR_SENSE	10	I	Sense Input from external USB host power switch (4.5.2)
	USB_PWR_CTRL	12	O	Discrete output to control external USB host power switch (4.5.2)
	USB_UDC-	14	IO	USB Host (4.5.2)
	USB_UDC+	16	IO	
11	I2C_SCL		IO	PC6 I ² C clock ⁹
13	SMTIO1		IO	PD1 Thermistor energize (4.3.5)
15	SMTIO0		IO	PD0 Passive panel enable (PNL_ENA)
	SPKR_L-	18	AO	Stereo Speaker, left channel (4.4.2)
	SPKR_L+	20	AO	
	SPKR_R-	22	AO	Stereo Speaker, right channel (4.4.2)
	SPKR_R+	24	AO	

⁹ PC6 and PC7 can be are used for the I²C bus master interface. Standard Bitsy G5 systems do not connect the ADSmartIO controller to the I²C bus. See section 4.5.4 for details.

Pin	Name	Pin	Type	Description	
17	ROW0		IO	PC0	ADSmartIO (see section 6.3.6)
19	ROW1		IO	PC1	
21	ROW2		IO	PC2	
23	ROW3		IO	PC3	
25	ROW4		IO	PC4	
27	COL0		IO	PA0	
29	COL1		IO	PA1	
31	COL2		IO	PA2	
33	COL3		IO	PA3	
	RI1	26	I	Serial 1 (EIA-232 with 3.3 V logic level volume production option) (4.5.1)	
	DCD1	28	I		
	DSR1	30	I		
	DTR1	32	O		
	RXD1	34	I		
	TXD1	36	O		
	CTS1	38	I		
	RTS1	40	O		
35	/EXT_IRQ3		I	External Interrupt 3 Input	
37	VDDX		PO	3.3 V	
39	MIC_GND		P	Microphone ground	
41					
	MIC L	42	AI	Stereo Microphone Input	
	MIC R	44	AI		
43	reserved				
45	/RESET_IN		I	External Reset Input (6.3.1)	
47	VDDX		PO	3.3 V	
	VCC	46	PO	5 V	
		48			
49	I2C_SDA		IO	PC7	I ² C data ⁹
	GND	50	P	ground	

3.3.7 J11 (J7): Supercapacitor Input

Supercapacitors are not supported by the Bitsy G5. This socket may not be populated on all boards.

3.3.8 J16 (J1): In-System Programming

Board Connector: 2x8, 2mm spacing, Samtec STMM-110-02-G-D-SM

Recommended Board-to-Board Connector: ESQT series (e.g. ESQT-110-02-F-D-450) [tbd]

This header is used during manufacturing for programming and test, but is not otherwise supported for application use. Production customers may use this header to reprogram boot code.

Pin	Name	Type	Description
1	PM_RSTMCU_B	I	Power on reset
2	TRSTB	I	JTAG
3	TMS	I	
4	GND	P	
5	TCLK	I	
6	GND	P	

Pin	Name	Type	Description
7	<i>TDI</i>	<i>I</i>	
8	<i>GND</i>	<i>P</i>	
9	<i>TDO</i>	<i>O</i>	
10	<i>GND</i>	<i>P</i>	
11	<i>RTCK</i>	<i>O</i>	
12	<i>2.7V</i>	<i>PO</i>	<i>2.75 V</i>
13	<i>PRG</i>	<i>I</i>	<i>ATMega/ADSmartIO</i>
14	<i>VDDX</i>	<i>PO</i>	<i>3.3 V</i>
15	<i>MISO</i>	<i>O</i>	<i>ATMega/ADSmartIO</i>
16	<i>DE_B</i>	<i>I</i>	<i>JTAG</i>
17	<i>MOSI</i>	<i>I</i>	<i>ATMega/ADSmartIO</i>
18	<i>GND</i>	<i>P</i>	
19	<i>SCK</i>	<i>I</i>	
20	<i>GND</i>	<i>P</i>	

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4 Feature Reference (tbd)

5 Power and Power Management (tbd)

6 System Specifications (tbd)

7 Board Revision History

7.1 *Identifying the board revision*

The product revision number of the Bitsy G5 is etched on the underside of the printed circuit board. That number is 170121-4000x, where "x" is the board revision.

7.2 *Revision History*

This section describes the differences between the revisions of the Bitsy G5.

7.2.1 Revision 2

Pre-production.

If you are using a Bitsy G5 as a replacement for the BitsyXb, please note these differences from revision A of the BitsyXb:

New Features

Freescale i.MX31 processor replaces XScale PXA270.

Freescale MC13783 Power Management and Audio Circuit:

- Replaces discrete microphone preamp circuitry and Crystal CS4202 AC'97 stereo codec.
- Replaces discrete switching regulator, linear voltage regulator and step down converters providing supply voltages for processor, memories, CPLD, and IO.
- Provides 4-wire analog touch panel capability.
- Replaces discrete RTC component.

DDR SRAM replaces SDRAM.

USB 2.0 Host port and USB 2.0 On-The-Go (OTG) port replaces USB 1.1 ports.

Changes

Pinout of JP2 swapped.

Voltage Setting	Jumper Setting	
	From	To
<i>V_{ddx} (3.3V)</i>	<i>1-2</i>	<i>2-3</i>
<i>V_{cc} (5.0V)</i>	<i>2-3</i>	<i>1-2</i>

Connector reference designators labeled differently. In this manual, all Bitsy G5 reference designators shown as (Jx).

LCD Panel Interface signals on J1 (J8) changed as follows:

Pin	From	To
<i>1</i>	<i>PNL_VEE</i>	<i>n/c</i>

Option to operate LCD panel buffers at either 3.3 V or 5 V removed. Supports LCD display data at 3.3 V only.

Series resistor removed from USB_RECONN output, J3 (J9) pin 33.

Input Power connector, J6, removed.

Secure Digital (SD/SDIO) and Multimedia Card (MMC) not supported.

Vee Adapter connector, J8, removed.

External CompactFlash not supported.

Connector J9 (J4) used for 3.3 V expansion bus only. Signals on J9 (J4) changed as follows:

Pin	From	To
2	<i>/CARDBDET2</i>	<i>n/c</i>
4	<i>/CARDBI6</i>	<i>n/c</i>
9	<i>CARDBSTSCHG</i>	<i>n/c</i>
11	<i>CARDBSPK</i>	<i>n/c</i>
12	<i>PCBA0</i>	<i>n/c</i>
13	<i>/CARDBREG</i>	<i>PCBA11</i>
14	<i>PCBA1</i>	<i>PCBA0</i>
16	<i>PCBA2</i>	<i>PCBA1</i>
18	<i>PCBA3</i>	<i>PCBA2</i>
20	<i>PCBA4</i>	<i>PCBA3</i>
21	<i>/CARDBVS2</i>	<i>n/c</i>
22	<i>PCBA5</i>	<i>PCBA4</i>
24	<i>PCBA6</i>	<i>PCBA5</i>
26	<i>CARDBVCC</i>	<i>n/c</i>
27	<i>CARDBIRQ</i>	<i>CF /INT</i>
28	<i>PCBA7</i>	<i>PCBA6</i>
30	<i>PCBA8</i>	<i>PCBA7</i>
31	<i>/CARDBIOWR</i>	<i>n/c</i>
32	<i>PCBA9</i>	<i>PCBA8</i>
33	<i>/CARDBIORD</i>	<i>BEB1 B</i>
35	<i>/CARDB VS1</i>	<i>n/c</i>
36	<i>PCBA10</i>	<i>PCBA9</i>
37	<i>/CARDBCE2</i>	<i>CS CF</i>
38	<i>/CARDBCE1</i>	<i>CS CF</i>
49	<i>/CARDBDET1</i>	<i>n/c</i>

Battery trickle charger not supported.

Signals on J3 (J9) changed as follows:

Pin	From	To
22	<i>CHARGE</i>	<i>ADSmartIO PB0</i>

Signals on J10 (J5) changed as follows:

Pin	From	To
43	<i>VREF</i>	<i>Reserved</i>

Supercapacitor Input connector J11 (J7) not supported.

RTC Interface changed from I²C bus to SPI.

USB OTG transceiver added to I²C bus at address 010 1101.

Pull up resistor value on I²C bus changed from 1.2k Ω to 2.2k Ω .

Crystal frequencies changed. Removed 24.576 MHz, 32.768 kHz and 13.000 MHz. Added 19.2 MHz and 26.000 MHz.

Red LED added to MC13783 trickle LED driver output.

ISP Port connector J16 (J1) changed from 16 pin STMM-108-02-G-D-SM to 20 pin STMM-110-02-G-D-SM. Pinout changed as follows:

Name	From	To
<i>/TRST</i>	<i>1</i>	
<i>TMS</i>	<i>2</i>	<i>3</i>
<i>GND</i>	<i>3</i>	<i>4</i>
<i>TDI</i>	<i>4</i>	<i>7</i>
<i>TCLK</i>	<i>5</i>	<i>5</i>
<i>VDDX</i>	<i>6</i>	<i>14</i>
<i>GND</i>	<i>7</i>	<i>6</i>
<i>TDO</i>	<i>8</i>	<i>9</i>
<i>/FEW</i>	<i>9</i>	
<i>FRDY</i>	<i>10</i>	
<i>MISO</i>	<i>11</i>	<i>15</i>
<i>VCC</i>	<i>12</i>	
<i>SCK</i>	<i>13</i>	<i>19</i>
<i>MOSI</i>	<i>14</i>	<i>17</i>
<i>PRG</i>	<i>15</i>	<i>13</i>
<i>GND</i>	<i>16</i>	<i>18</i>
<i>PM_RSTMCU_B</i>		<i>1</i>
<i>TRSTB</i>		<i>2</i>
<i>GND</i>		<i>8</i>
<i>GND</i>		<i>10</i>
<i>RTCK</i>		<i>11</i>
<i>2.7V</i>		<i>12</i>
<i>DE_B</i>		<i>16</i>
<i>GND</i>		<i>20</i>

7.2.2 Revision 3

Initial release.

Secure Digital (SD/SDIO) and Multimedia Card (MMC) supported.

Pull up resistor value on /SD_CD signal, J7 (J2) pin 10, changed from 47kΩ to 4.7kΩ.

7.2.3 Revision A

Production release. Available Q4 2007.

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